# SIS Analytics Challenge

Blake Moore

# Question 1:

Which is the most important Defensive Line position?

### Most Important Defensive Line Position

- Although the defensive line has many different specific techniques, I have chosen to split the defensive line into two different positions: Defensive Tackles and Defensive Ends
- When determining the value for defensive linemen, I feel that the most important statistic points to look at are tackles, pressures, and sacks
- With pressures and sacks, being able to get to the quarterback on passing downs is incredibly valuable to a defense and can create big plays to stop the offense in its tracks
- With tackling, it is important for defensive linemen to be able to make plays against the run and make an impact on the running back before he gets to the next level of the defense



# Most Important Defensive Line Position cont.

- I believe that the most important defensive line position is the defensive end. I will be analyzing defensive linemen in a 4-3 scheme to better compare the players

- These include the 6/7 technique edge rushers along with the 9/Outside technique edge rushers. With many defensive ends being able to rotate between different techniques throughout a season or even in a single game, it makes sense to group them together as one position

Most notable defensive ends currently in the NFL:

- Nick Bosa
- Danielle Hunter
- Cameron Jordan
- Myles Garrett



- Below are the percentages of snaps played this past season in either a 6, 7, 9, or outside technique for the four players listed on the last slide (According to the SIS data provided)

	2019 Defensive End Snaps Technique (Percentages)									
Player	6	7	9	Outside	Total					
Nick Bosa	14.7%	7.6%	64.8%	5.7%	93.3%					
Cameron Jordan	3.2%	9.3%	7.3%	57.7%	77.7%					
Danielle Hunter	28.9%	21.9%	26.9%	4.3%	82.1%					
Myles Garrett	10.7%	13.5%	37.1%	18.5%	80.0%					

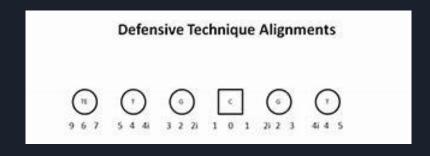
 Even though a majority of these players' snaps were on the edge, they are versatile enough to play in nearly all defensive line techniques and can make a significant impact from anywhere on the field  Here is another look at how versatile the top defensive ends were this past season. The table below shows the technique each player was lined up in and the percentage of their total pressures that came from those specific techniques (According to the SIS data provided)

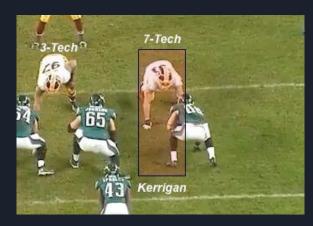
	Pressure Percentages (2019)  Technique									
Player	6	7	9	Outside						
Nick Bosa	11.3%	6.8%	79.5%	2.3%						
Cameron Jordan	0.0%	6.3%	6.3%	87.5%						
Danielle Hunter	26.5%	29.4%	41.1%	2.9%						
Myles Garrett	0.0%	9.1%	72.3%	18.1%						

- As you can see, each of the four defensive ends being evaluated made an impact from all different techniques. This makes it difficult to judge whether one specific technique is more important to a defense and is the main reason why I grouped all defensive ends together when judging their importance to a defense

#### Defensive End Role on Defense

- When looking at the job of a defensive end, they must be able to create pressure on the quarterback while rushing on the edge and be able to make tackles out in space on outside handoffs or toss plays
- Pass Rush and Run Defense are the two key areas for defensive ends and those will be the two data points I examine to determine why defensive ends are the most important defensive line position





#### Pass Rush

- Looking at last year's playoff teams and how they performed in rushing the passer, the teams with the highest pressure percentage were more likely to make the playoffs

Rank	Team	Stacked Box%	Dropbacks Faced	Pressure%	Blitz%	2019 Playoffs	2020 Playoffs
1	Saints	14.80%	676	41.00%	29.60%	YES	YES
2	Patriots	17.60%	606	40.90%	30.00%	YES	YES
3	Steelers	15.10%	592	40.70%	34.80%	NO	YES
4	Eagles	25.30%	634	40.20%	21.50%	YES	YES
5	Ravens	13.90%	598	39.80%	45.20%	YES	YES
6	Packers	11.70%	607	39.20%	17.50%	YES	YES

- Last season, 5 out of the top 6 teams in pressure percentage made the playoffs and if the 2019 playoffs were using the new playoff format, all 6 of the top 6 pressure percentage teams would have made the playoffs. This shows the importance of having a strong pass rush and elite pass rushing defensive ends

### Pass Rush cont.

- Using Sport Info Solutions DataHub Pro, it is easy to see how valuable defensive ends are when it comes to rushing the passer
- During the 2019 season, defensive ends were responsible for 9 out of the top 10 pass rushing defensive linemen for all downs as well as on 3rd downs
- Defensive ends are the most productive defensive linemen in getting to the quarterback,
   which is arguably the most important job for the defensive line

In this video, the 9 technique defensive end on the right side of the defense uses his power and leverage to get off his blocker and tackle the quarterback for a sack



# Pass Rush on All Downs; Value (2019) (SIS DataHub Pro)

Print	Download									
Rank 🔷	Season \$	Player \$	Team <b>♦</b>	Pos. 🛊	Pass Snaps +	Pass Rushes 🖣	Pressures +	Points Saved ~	EPA ≑	Positive%
1	2019	Joey Bosa	Chargers	DE	411	411	71	11.8	90.0	50%
2	2019	Cameron Jordan	Saints	DE	480	458	86	10.9	24.4	40%
3	2019	Maxx Crosby	Raiders	DE	402	396	53	8.7	106.5	46%
4	2019	Robert Quinn	Bears	DE	331	327	59	8.2	52.9	45%
5	2019	Aaron Donald	Rams	DT	471	471	70	7.3	46.3	41%
6	2019	Mario Addison	Bills	DE	368	353	42	3.5	69.3	44%
7	2019	Danielle Hunter	Vikings	DE	472	465	79	3.3	82.9	45%
8	2019	Justin Houston	Colts	DE	399	386	44	2.9	85.1	47%
9	2019	Myles Garrett	Browns	DE	267	260	41	2.5	22.2	43%
10	2019	Arik Armstead	49ers	DE	405	401	45	-0.5	34.1	42%

# Pass Rush on 3rd Downs; Value (2019) (SIS DataHub Pro)

Rank \$	Season +	Player 🔷	Team 🔷	Pos. 🏺	Pass Snaps	Pass Rushes	Pressures 🖣	Points Saved -	EPA 🌲	Positive%
1	2019	Joey Bosa	Chargers	DE	124	124	28	2.9	66.5	46%
2	2019	Cameron Jordan	Saints	DE	147	143	27	2.5	3.7	36%
3	2019	Aaron Donald	Rams	DT	146	146	21	1.3	41.2	40%
4	2019	Brandon Graham	Eagles	DE	140	137	21	1.2	22.3	32%
5	2019	Mario Addison	Bills	DE	97	93	14	0.4	24.4	36%
6	2019	Robert Quinn	Bears	DE	102	100	21	0.1	10.1	36%
7	2019	Benson Mayowa	Seahawks	DE	104	98	19	-0.5	38.6	38%
8	2019	Danielle Hunter	Vikings	DE	140	137	23	-1.1	33.8	42%
9	2019	Arik Armstead	49ers	DE	122	121	16	-1.6	20.2	37%
10	2019	Frank Clark	Chiefs	DE	106	98	11	-2.0	23.5	34%

## Pass Rushing Data Results

- From looking at the SIS DataHub Pro, it shows that when rushing the passer, defensive ends are more productive than defensive tackles in:
  - Pressures
  - Points Saved
  - EPA
  - Positive Percentage
- It is obvious that when getting to the quarterback, defensive ends are the more important defensive lineman, especially on 3rd downs, but are they more productive when stopping

the run?



#### Run Defense

- Defensive ends not only have to get to the quarterback, they have to be able to stop the run as well. That is what makes them so important to a defense
- According to the SIS Datahub Pro, defensive ends make up 7 out of the top 10 defensive linemen when it comes to stopping the run on all downs and 8 out of the top 10 on 3rd down run defense
- Not only can they rush the passer but they can make an impact in the run game, especially
  on runs to the outside

In this video, you can see an example of a 9 technique defensive end quickly diagnosing the run play and collapsing to the pocket to make a tackle on the running back for little to no gain on the play



# Run Defense on All Downs (2019) (SIS DataHub Pro)

Print	Download								
Rank 🍦	Season +	Player 👙	Team \$	Pos. 👙	Snaps 🔷	Rush Snaps 🛊	Points Saved ~	EPA ≑	Positive%
1	2019	Joey Bosa	Chargers	DE	791	380	19.3	-75.3	34.2%
2	2019	Grady Jarrett	Falcons	DT	769	353	15.3	-73.0	38.5%
3	2019	Carlos Dunlap	Bengals	DE	715	359	14.3	-65.4	37.9%
4	2019	Sam Hubbard	Bengals	DE	824	426	12.5	-64.6	38.5%
5	2019	Danielle Hunter	Vikings	DE	846	374	7.3	-123.6	35.3%
6	2019	Matt Ioannidis	Redskins	DE	785	418	7.3	-60.3	36.1%
7	2019	Cameron Heyward	Steelers	DE	836	419	5.4	-153.0	32.9%
8	2019	Davon Godchaux	Dolphins	DT	680	376	2.5	-29.9	42.0%
9	2019	Sheldon Richardson	Browns	DT	741	365	2.3	-64.7	35.1%
10	2019	Jonathan Allen	Redskins	DE	692	362	-3.7	-61.3	35.1%

# Run Defense on 3rd Downs (2019) (SIS DataHub Pro)

Print	Download								
Rank 🌲	Season \$	Player 🌲	Team 🌲	Pos.	Snaps	Rush Snaps 🖨	Points Saved _	ЕРА ≑	Positive%
1	2019	Melvin Ingram III	Chargers	DE	145	46	7.7	-25.3	34.8%
2	2019	Brandon Graham	Eagles	DE	190	50	5.4	-44.7	22.0%
3	2019	Calais Campbell	Jaguars	DE	181	51	4.0	-23.2	29.4%
4	2019	Joey Bosa	Chargers	DE	185	61	3.8	-35.0	39.3%
5	2019	Nick Bosa	49ers	DE	177	47	2.1	-53.1	23.4%
6	2019	Jonathan Allen	Redskins	DE	139	47	1.2	-26.9	23.4%
7	2019	Javon Hargrave	Steelers	DT	118	49	1.2	-13.3	46.9%
8	2019	Sam Hubbard	Bengals	DE	170	54	0.9	-24.5	31.5%
9	2019	Benson Mayowa	Raiders	DE	130	26	0.1	-34.1	7.7%
10	2019	Chris Jones	Chiefs	DT	142	46	0.0	-34.3	30.4%

#### Run Defense Data Results

- Defensive Ends are more than just pass-rushers
- When compared to defensive tackles in run defense, defensive ends were more productive in:
  - Points Saved
  - EPA
  - Positive Percentage
- Their ability to stop the run and be more productive in doing so than defensive tackles makes them the most important position on the defensive line
- With the primary job of a defensive tackle being to stop the run, defensive ends still make a greater impact in run defense

# Question 2:

What is the nature of the distribution of talent between the defensive line positions?

# Distribution of Talent Between D-Line Positions

- A 4-3 defensive front consists of the 1 technique and 3 technique defensive tackles on the interior with the 6/7 technique and 9 technique on the outsides
- Each position/technique has a specific role on the team and has a prototypical player to fill each position
- To better understand the distribution of talent along a defensive line, it is important to understand each specific defensive line technique



# Defensive Line Technique Prototypes (4-3 Scheme)

1-Technique: An interior lineman (usually large in size) who is responsible for filling in the running lanes through either of the "A" gaps. They can also make an impact when rushing the passer, but their primary goal is to stop the run

3-Technique: An interior lineman with great athleticism to get around the interior offensive linemen and get to the quarterback. While lining up over the "B" gap, the 3-technique is key in rushing the passer and collapsing the pocket from the inside while also being used in stopping the run



# Defensive Line Technique Prototypes (4-3 Scheme) cont.

6/7-Technique: An edge rusher who has the combination of speed and strength to rush the passer on the outside. The 6/7 technique can use their athleticism to rush on the outside as well as use their strength to bull rush the tackle and make a move to get to the inside. They are also responsible for holding the edge on outside run plays

9-Technique: The edge rusher opposite to 6/7 technique who relies on speed to make plays. They line-up far outside against the tackle or against the tight end. With a quick first step, the 9 technique is primarily used as a pass-rusher rather than being balanced like a 6/7 technique defensive end.



### Talented Pass Rusher Example

- Each technique has their roles on a defense but 6/7 and 9/Outside techniques are the most important positions for a defense
- Having a premiere talent at defensive end can completely transform a defense and immediately improve a team's likelihood for success
- A recent example of this would be the 2019 San Francisco 49ers





#### 49ers Draft Nick Bosa

- After drafting Nick Bosa, defensive end from Ohio State, with the 2nd overall pick in the 2019 NFL draft, the 49ers defense went from having the 27th ranked defense in 2018 to the 5th ranked defense in 2019 (According to FOX Sports)
- One could argue that the 49ers defense had vast improvement this past season due to the
  development of their young talent of Fred Warner and Emmanuel Moseley as well as their
  additions of Dre Greenlaw in the draft and Dee Ford who was acquired via trade, but I
  believe the addition of now pro-bowler Nick Bosa was the most important addition to the
  49ers defense

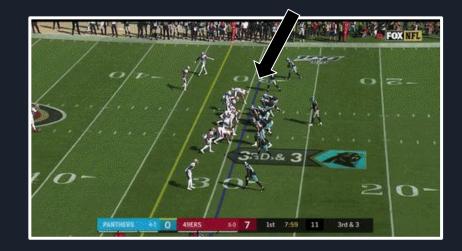


## Nick Bosa's Rookie Season Impact

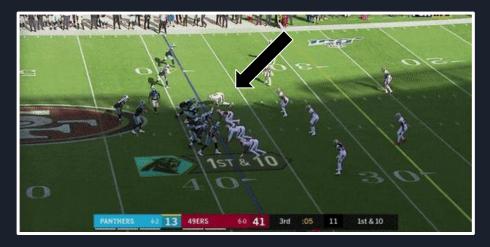
- Nick Bosa's immediate impact of 9 sacks, 47 combined tackles, 25 QB hits, and a team high 16 tackles for loss was the main reason for the 49ers sudden defensive success and led them to Super Bowl LIV
- The 49ers had a 4-12 record in 2018 but improved to 13-3 this past year in large part because of the addition of a talented edge rusher
- While it is important to have as much talent as you can across your defensive line, having an elite edge rusher can and will immediately improve a defense



In this video, Bosa is lined up as the 7 technique on the left side of the defense. Using his strong hand technique and his elite athleticism, he creates separation against his man and works back towards the quarterback to get the sack



In this video, Bosa is lined up as the 7 technique on the right side of the defense. He avoids the cut block and quickly reacts to the dump off pass to intercept the ball and create a big play for the defense



## Elite Edge Rushers

- As you can see, having an elite edge rusher creates a huge impact for a defense and Nick Bosa is just one of the many examples of how important they are to a team
- Because of this, NFL teams are starting to notice the importance of elite pass rushers and are beginning to pay them more than interior defensive linemen
- According to Sportrac.com, 14 of the top 20 highest paid defensive linemen are defensive ends





## Average Salary Among NFL Defensive Linemen (2020) (Sportrac.com)

- Aaron Donald-DT-\$22,500,000
- 2. Demarcus Lawrence-DE- \$21,000,000 12. J.J. Watt-DE-\$16,667,571
- 3. Deforest Buckner-DT-\$21,000.000
- Frank Clark-DE-\$20,800,000
- 5. Trey Flowers-DE-\$18,000,000
- Yannick Ngakoue-DE-\$18,000,000
- Cameron Jordan-DE-\$17,788,000
- Dee Ford-DE-\$17,100,000 8.
- Fletcher Cox-DT-\$17,100,000
- 10. Arik Armstead-DE-\$17,000,000

- 11. Grady Jarrett-DT-\$17,000,000
- 13. Geno Atkins-DT-\$16.300.000
- 14. Chris Jones-DT-\$16,126,000
- 15. Leonard Williams-DE-\$16,126,000
- 16. Kawann Short-DE-\$16.100.000
- 17. Melvin Ingram-DE-\$16,000,000
- 18. Jurrell Casey-DE-\$15,100,000
- 19. Dante Fowler Jr.-DE-\$15.000.000
- 20. Danielle Hunter-DE-\$14,400,000

## Defensive Line Salary Analysis

- It is obvious that teams value the defensive end position more than defensive tackle and with good reason. Defensive ends have a more consistent impact in both pass rushing as well as against the run, and have been proven to vastly improve a defense when they have pro-bowl caliber talent
- This is why the talent distribution of NFL defensive lines usually consists of having their most talented players on the edge to make a stronger impact for the team and why talented defensive ends are being signed to expensive, long-term contracts

**CLEVELAND BROWNS** 



Myles Garrett, Browns Reportedly Nearing 5-Year, \$125M Contract Extension

Saints, Cameron Jordan agree to three-year contract extension

Arik Armstead, 49ers agree to 5year mega contract

# Question 3:

In which in-game or roster construction scenarios would the answer to Question 1 change?

### Different Roster Construction

- The biggest exception to the idea that defensive ends are more important than defensive tackles comes from analyzing the talent and data of the Los Angeles Rams' star player: Aaron Donald



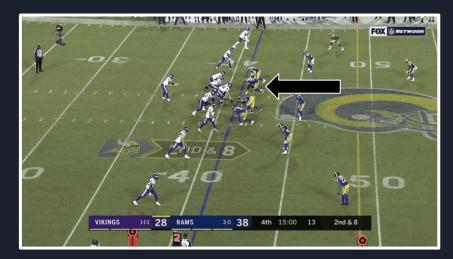
#### Aaron Donald

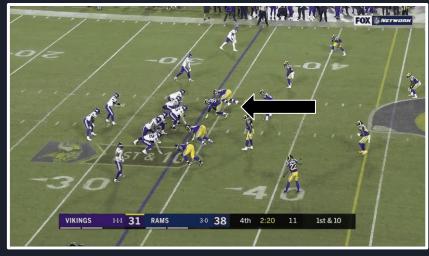
- The Los Angeles Rams have the luxury of not needing elite defensive ends to create pressure on the quarterback because they have Aaron Donald
- Donald is the prototypical 3 technique defensive tackle and can wreak havoc on opposing offenses
- To better understand how dominant of a player Aaron Donald is, it is best to watch his film and analyze his data



In this video, Aaron Donald uses his power and quick hands to get on the inside of his man and bursts through the "A" gap to get the sack

In the same game as the above video, Aaron Donald makes another big play by using his quickness off the line and his excellent hand technique to get around his man on the outside, rush the "B" gap, and immediately take down the quarterback





## Aaron Donald Film Analysis

- From watching Aaron Donald's film, it is easy to see why he is just as valuable as a defensive end, even as a 3-technique defensive tackle
- He has the power, speed, and technique to consistently get around his man and create big plays
- While the main goal of an edge rusher is to rush the passer, the goal of a 3-technique is to pass rush, but they also have to be more involved in the run game than defensive ends
- Even though Aaron Donald plays on the interior of the defensive line, he is still showing incredible production as a pass rusher



# Pass Rush on All Downs; Value (2019)

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10	2019	Frank Clark	Chiefs	DE	106	98	11	-2.0	23.5	34%

### Aaron Donald Data Analysis

 Looking back at the pass rush data from earlier, it shows that Aaron Donald is the only defensive tackle on the top 10 pass rushing defensive line list.
 He is also ahead of many dominant defensive ends, all while playing on the interior of the defensive line



- This past season on all downs, in comparison to top defensive ends, Donald had more:
  - Pressures (70) than Maxx Crosby (53) and Robert Quinn (59)
  - Points saved (7.3) than Danielle Hunter (3.3) and Mario Addison (3.5)
  - EPA (46.3) than Myles Garrett (22.2) and Arik Armstead (34.1)
  - Positive Percentage (41%) than Cameron Jordan (40%)

- Below is the snap percentage table used earlier to look at four of the top pass rushing defensive ends this past season but now including Aaron Donald's snap percentages this last season (According to the SIS data provided)

	2019 Defensive End Snaps Technique (Percentages)									
Player	6	7	9	Outside	Total					
Nick Bosa	14.7%	7.6%	64.8%	5.7%	93.3%					
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Danielle Hunter	28.9%	21.9%	26.9%	4.3%	82.1%					
Myles Garrett	10.7%	13.5%	37.1%	18.5%	80.0%					
Aaron Donald	0.02%	1.20%	2.41%	0.04%	4.33%					

Even though Donald played a majority of his snaps on the interior of the defensive line he
was equally, if not more, productive than the top defensive ends in the league when it
came to getting to the quarterback

- The impact that Donald has on the field is reimbursed by his salary off the field. He is the highest paid defensive lineman and rightfully so
- 1. Aaron Donald-DT-\$22,500,000
- 2. Demarcus Lawrence-DE- \$21,000,000
- 3. Deforest Buckner-DT-\$21,000,000
- 4. Frank Clark-DE-\$20,800,000
- 5. Trey Flowers-DE-\$18,000,000
- 6. Yannick Ngakoue-DE-\$18,000,000
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- 8. Dee Ford-DE-\$17,100,000
- 9. Fletcher Cox-DT-\$17,100,000
- 10. Arik Armstead-DE-\$17,000,000

- 11. Grady Jarrett-DT-\$17,000,000
- 12. J.J. Watt-DE-\$16,667,571
- 13. Geno Atkins-DT-\$16,300,000
- 14. Chris Jones-DT-\$16,126,000
- 15. Leonard Williams-DE-\$16,126,000
- 16. Kawann Short-DE-\$16,100,000
- 17. Melvin Ingram-DE-\$16,000,000
- 18. Jurrell Casey-DE-\$15,100,000
- 19. Dante Fowler Jr.-DE-\$15,000,000
- 20. Danielle Hunter-DE-\$14,400,000

### Aaron Donald

- Aaron Donald is truly the one exception when it comes to value on the defensive line
- Even though he plays as a 3-technique, he is still capable of creating pressure on the quarterback and can make just as much of an impact as an elite defensive end





#### Conclusion

- Defensive Ends are the most important defensive line position. They are more productive than defensive tackles in pass rush as well as run defense and the addition of an elite defensive end can immediately improve a defense
- While Aaron Donald creates just as much of an impact as an elite edge defender, it is rare to find an interior defensive lineman with the talent and production as Donald
- Defensive ends typically do not need to be as talented as Aaron Donald to make a sizable impact and you can find strong defensive ends in later rounds of the NFL draft, for example:
  - Danielle Hunter: 3rd Round
  - Justin Houston: 3rd Round
  - Maxx Crosby: 4th Round
  - Mario Addison: Undrafted

### Future Analysis

- To answer the above questions I was able to find other data besides the data provided
- Being able to use Sport Info Solutions' DataHub Pro as well as other sport sites gave me the opportunity to compare and contrast different statistics to better come to my final conclusion
- If I were to have more time and resources, I would have liked to personally view the film of all the pressures created by top defensive ends as well as by Aaron Donald to see the similarities and differences in the way that they impact every game

#### Sources

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